



UMR Acoustique Environnementale
(Université Gustave Eiffel – Cerema)
INTERNSHIP PROPOSAL 2021

Internship topic

Fast multi-asperity approach for tyre/road contact

Education level

Master (M2) Master (M1) Ingénieur Licence Bac + 2

Required skills

Master of Science in Computational Mechanics. A complementary experience in contact mechanics would be appreciated. Skills in numerical methods and programming (C/C++, Python, Matlab) are essential. Writing skills in French and/or English are expected.

Description

A multi-asperity approach has been developed within UMRAE for the resolution of rough contact problems within the framework of the tyre/road noise modelling. This approach considers the 3D road surface texture at the interface between the tyre and the pavement. However, it requires improvements at micro-scale for the modelling of noise generation mechanisms depending on small texture scales.

The aim of the internship is to develop a method for solving rough contact problems by a multi-asperity approach based on a multi-level fast multipole method. The work will mainly rely on Boussinesq's theory, which corresponds to the contact problem in static conditions at the surface of an elastic half-space. The interaction function of the problem will be approximated by solid harmonics, which will make possible to use a method of moments to speed-up the contact calculation at the micro-scale. The developed fast multi-asperity approach will be compared to a reference method, first in the case of surfaces with simplified geometry, then in the case of real pavement surfaces.

Internship location

- Uni Eiffel, Campus Lyon** (25, avenue François Mitterrand, Case24, Cité des mobilités, F-69675 Bron Cedex)
 Uni Eiffel, Campus Nantes (route de Bouaye, CS4, F-44344 Bouguenais Cedex)
 Cerema – Strasbourg (11, rue Jean Mentelin, Strasbourg-Koenigshoffen, F-67035 Strasbourg)

Internship duration (dates and duration can be adapted)

Starting date: 01/03/2021
Ending date: 30/08/2021
Duration: 6 months
www.umrae.fr

Contact

M. Julien CESBRON
Tel. 02 40 84 56 62
Email : julien.cesbron@univ-eiffel.fr

Allowance

Compensation equivalent to 15% of the hourly ceiling of the Sécurité Sociale (loi n°2014-788 du 10 juillet 2014)
<https://www.service-public.fr/simulateur/calcul/gratification-stagiaire>